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Pre-Feasibility Business Models for High Tunnel Production and Light Processing/Accumulation

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Abstract
This report, prepared for the March 2009 Final Report of Tunnels to Tables, explains business models for high tunnel production.

Disciplines
Agribusiness | Agriculture

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Production Models

For the purpose of this report, production will be split evenly between tomatoes and brambles (raspberries and blackberries). Yields for these crops on a square foot yield basis resulted in 1.8 pounds per square foot for tomatoes and 0.5 pounds for brambles.

The production scale for this project was conducted in two, single 96 foot by 30 foot high tunnels (2,880 square feet). A complex consisting of several high tunnels will likely be more efficient and economical to operate on a per unit basis than a single tunnel. Estimated net profit from these single, high tunnel units are $2.60 per square feet for tomatoes at $2 per pound and $2.00 per square feet from brambles priced at $6 per pound.

These prices may reflect a slightly higher than average price point for some areas but is done to reflect a small premium for early market harvest obtained by the high tunnel production system.

Estimates of postharvest fruit and vegetables losses are often estimated over 30 percent. Reducing these losses represent a tremendous opportunity for increasing the profitability at all levels of the distribution chain.

Properly matching postharvest processing infrastructure with the accessible market is critical to the success of an operation and should also be a key determinant in choosing the proper business structure for each enterprise. Postharvest processes include the integrated functions of cleaning, grading, cooling, storing, packaging, transporting and marketing. Careful consideration needs to be given to determining the most cost-efficient and timely methods of moving product from the field to the table.

The purpose of this report is to compare the opportunities and constraints of participating in each of the various business models or combination of models, using the most appropriate criteria for evaluation.

Business Structures

For the purposes of this study, the three business models to be compared and the assumptions for each business are listed below.

1. Sole Proprietor: For this scenario, we will assume an on-farm sole proprietor operation developed to supplement on-farm income. All aspects of production through postharvest handling are performed by the producer, up to and including marketing.
2. Partnership/Cooperative: For this scenario, several local producers will cooperatively manage all of the postharvest handling and marketing responsibilities of their produce. All management,

labor, expenses and income will be shared among the producers. The example business structure will be considered a loosely formed cooperative. The primary purpose of the cooperative effort will be to collectively share in postharvest handling and marketing procedures, in order to access wholesale distribution chains. Financials goals are to maximize use of product and enhance efficiencies in the time and expense of marketing.

3. Aggregator: The final business scenario is for the postharvest and handling to be coordinated and managed by an independent third-party aggregator. All aspects of the operation and marketing are managed by the independent entrepreneur. Producer participation is limited to providing produce through contracts or other open-market arrangements. Financial goals for this business are to achieve balanced growth by matching production to market demand while maximizing profits through volume sales and reduced waste.

Some basic principles regarding the selection of the appropriate business structure are outlined in the Iowa Food Entrepreneurs Resource Guide, which can be accessed at: http://www.extension.iastate.edu/valueaddedag/info/iowafoodentrepreneursresourceguide.htm

Sole Proprietorship

This is the easiest, least costly way of starting a business. A sole proprietorship can be formed by finding a location and opening the door for business. There are likely to be fees to obtain business name registration, certificate and other necessary licenses. Attorney's fees for starting the business will be less than the other business forms because less preparation of documents is required and the owner has absolute authority over all business decisions. Of course, a sole proprietor also assumes all the risks and liabilities associated with the business. Limited resources including capital, labor and infrastructure can also limit the capacity of these entrepreneurial business structures.

Cooperative

A cooperative business belongs to the people who use it. The members/owners use the cooperative as a source for the goods and services they need. Members/owners share in the control of their cooperative, meet at regular intervals, review detailed reports and elect directors from among themselves. In recent years, "value-added" cooperatives have evolved to provide more specialized services than those typically offered by traditional cooperative models. Although still member/owner organizations, the structures of value-added cooperatives differ from those of traditional cooperatives in several ways:

Traditional Cooperative	Value-Added Cooperative
Personal liability limited to investment.	Personal liability limited to investment.
Ownership generally **not** transferable.	Ownership generally transferable to any other member or person who is board approved.
Life of traditional cooperative is perpetual.	Life of value-added cooperative is perpetual.
Centralized management, no less than five board members.	Centralized management, no less than three board members.
Distributions of earnings based on level of patronage to the cooperative.	Distribution of earnings based on level of patronage to the cooperative.
Shareholders taxed for the amount of earnings allocated to them. Retained earnings are taxable	Shareholders taxed for the amount of earnings allocated to them. Retained earnings are taxable to the cooperative.

to the cooperative.	
Delivery rights are essentially open.	Delivery rights limited or closed. Membership has delivery rights and obligations.
Services tend to be covering wide range.	Primary focus tends to be processing.

Aggregator

The aggregator may choose to operate under several different busienss structures including but not limited to the following types:

- Limited liability company
- General partnership
- Limited partnership
- Limited liability partnership
- Corporation

Limited liability company

Limited liability companies (LLCs) are a hybrid form of entity that combines some characteristics of a corporation with other characteristics of a partnership. The LLC offers limited liability for all of its members and the option of centralized management (which the LLC may choose not to adopt). The LLC also offers partnership tax status with flexibility in handling varied contributions and types of capital. The LLC requires a tailored agreement that spells out all details, while corporations may often be formed with standardized documents.

General partnership

A general partnership can be formed simply by an oral agreement between two or more persons, but a legal partnership agreement drawn up by an attorney is highly recommended. Legal fees for drawing up a partnership agreement are higher than those for a sole proprietorship but may be lower than incorporating. A partnership agreement could be helpful in solving any disputes. However, partners are responsible for the other partner's business actions, as well as their own.

A partnership agreement should include the following:

• Type of business. • Amount of equity invested by each partner. • Division of profit or loss. • Partners' compensation. • Distribution of assets on dissolution.	• Duration of partnership. • Provisions for changes or dissolving the partnership. • Dispute settlement clause. • Restrictions of authority and expenditures. • Settlement in case of death or incapacitation.

Limited partnership

Limited partnerships are much the same as limited liability companies but must include one partner (the general partner) having unlimited liability for the debts of the partnership. Special rules govern whether a corporate general partner is carrying enough risk to qualify the entity as a partnership versus a corporation for tax purposes.

Limited liability partnership

Limited liability partnerships (LLPs) are general partnerships that have chosen LLP status. Partners of an LLP have unlimited liability for their own actions but limited liability for the actions of their partners. LLP status may work for businesses that have typically been conducted as general partnerships and whose partners now wish to limit their potential liability for each others' actions. Special rules govern the LLP election by partnership of licensed professionals.

Corporation

A corporation is legally separate from its shareholders. This is the most important feature distinguishing it from a partnership or proprietorship. It is definitely best to seek legal counsel when setting up a corporation.

This type of business is usually the most costly to form, especially if organizational problems are complex. People usually incorporate to limit personal liability for the debts and liabilities of the business. However, with many new businesses, this limit of personal liability applies only to judgments brought against the company for negligence, defective products or frivolous suits.

In fact, the owner(s) of a new business will usually remain liable for the repayment of loans and other debts because most major creditors, especially lenders, will try to limit their risks by requiring owners to pledge their personal assets as security for a debt. In some cases, an officer or employee of a corporation may also be personally liable for failure to withhold taxes.

A corporation is a separate legal entity and a more structured form of business. It can continue to function even without the existence of original ownership or other key individuals. It also has advantages in terms of enabling employees to participate in various types of insurance and profit sharing. A corporation has more flexibility in terms of different approaches to taxation.

"S" Corporation. The S corporation provides the benefits of incorporation while also eliminating federal corporate income tax by passing the tax liability directly to the stockholders. The IRS allows all profits to pass through to the shareholders' personal tax returns. S status is available to small companies with up to 35 individual shareholders. S corporations can only issue one class of stock, no corporate shareholders are allowed and all shareholders must be U.S. citizens or taxpayers.

"C" Corporation. If a corporation does not qualify for S corporation status to be taxed as a small business, then it must be treated as a C corporation. The decision to be a C corporation is one of default: a corporation is automatically a C corporation unless it obtains approval from the Internal Revenue Service to be taxed under a different provision. If the corporation will offer its stock to the public via a stock exchange, for example, it would not qualify as an S corporation. Limited liability companies are not part of this discussion because they are taxed as partnerships and enjoy pass-through taxation similar to S corporations but without the restrictions, including the number and qualification of shareholders.

Feasibility Comparison

Each of these business structures can be compared to each other based on the five areas of a feasibility study as outlined by the USDA guidelines for feasibility studies. The intent of the report is to identify and

compare the key elements of success that can be managed within a business sector and provide quantifiable benchmarks that can be applied to other, similar business situations.

The five areas of comparison are:

1. Economic Impact
2. Market
3. Technical
4. Management
5. Financial

Economic impact feasibility

The 'Economics' section of a feasibility study deals primarily with core business principles that determine if there is a defensible argument that the business and its core operational plan is a sound idea. This section also addresses questions about basic business principles including common constraints such as: location, available infrastructure and adequate labor. Economics for this section are not to be confused with the 'financials' of the business.

Sole proprietor.

Economic Feasibility Issues	Strength/Weakness	Comments
Labor issues	Limited labor pool	The operation can be severely limited by the expertise and availability of the individual producer. Rarely does one individual have the necessary skill set or time to be highly proficient in production, processing, marketing and managing.
Utilities	Limited to on-farm availability	Although the constraints are minimal, the operation is highly dependent on the resources that are already available – major changes to utility systems and building infrastructure will add significant costs to any operation.
Transportation	Minimal constraints	Since produce will likely be delivered to local markets by the producer rather than picked up for transportation, constraints are minimal.
Site location	Production is limited to local market access	Local access to markets and transportation costs could likely be the significant factor in profitability and the limiting factor controlling future growth.
Overall economic impact	Minimal impact other than to producer	Little impact beyond the farm gate – all business decisions need to be based on the comparative value to other on- or off-farm business opportunities.

Partnership/Cooperative.

Economic Feasibility Issues	Strength/Weakness	Comments
Labor issues	Shared labor	Shared labor resources are beneficial, but a structured system of responsibilities and accountability is crucial to success.
Utilities	Best available site	More flexibility in site location and access to needed infrastructure through utilization of a centralized location.
Transportation	Best available site	More flexibility in site location and access to needed infrastructure through utilization of a centralized location.
Site location	Increased scope increases market range. Multiple location options ensure optimum placement.	Multiple site options allow for selecting the most accessible, logical site.
Overall economic impact	Shared resources minimizes risk	Capitalizing on the economies of scale should result in improved overall impact to the participants.

Aggregator.

Economic Feasibility Issues	Strength/Weakness	Comments
Labor issues	Focused skill set	Actual post-harvest product-handling hours are often under estimated by sole proprietors and must be accounted for. However, 100 percent of attention is now focused on specific tasks essential for quality post-harvest product handling.
Utilities	Best available site	More flexibility and elimination of individual special needs for storage and processing.
Transportation	Best available site	Consolidation of loads builds efficiency in transportation costs.
Site location	Optimized and centralized	More flexibility in processing and post-harvest storage as well as market opportunity.
Overall economic impact	Economies of scale result in more market access	The addition of an additional link in the value-chain results in an additional division of profits. Efficiencies, scope and market access need to offset the additional touch, but significant opportunities arise with this additional expertise and potential processing/storage options.

Economic impact feasibility summary. When comparing a sole proprietor operation to a partnership/cooperative, the partnership/cooperative can yield significant flexibility, advantages and opportunities in labor, utilities, transportation and site location options. The partnership/cooperative will also inherently add more structure to the operation that can enhance overall effectiveness. The addition of an aggregator to either of the other operational structures will add an additional layer of cost but

potentially can yield significant enhancements to post-harvest processing, storage, transportation logistics and market opportunities, resulting in increased profitability.

Market feasibility

A successful food business requires experience in raising a quality crop and in knowing how to store, transport and sell the product. Marketing food products usually is not as easy or doesn't come as naturally to producers as growing the product does; however, marketing should have just as much or more emphasis as growing the product. One of the first steps in the development of any business model should be the marketing process.

Because of seasonality, freshness, quality and the perishable nature of fruit and vegetable products, having a commitment from a buyer at the beginning of the season is a necessity, unless your product goes directly into a processing or preservation mode. Knowing your market destination and getting the product to that market in a timely manner is of utmost importance. Some questions that might be beneficial for a fruit and vegetable grower to consider when determining which market or business structure is best include:

- Who are my customers?
- What is my profit potential?
- In terms of facilities, am I set up to meet that market?
- Do I have adequate resources to deliver into that market?
- Who will pay me the most for my product, or who will take most of my product?
- Are the costs of getting into that market feasible?
- Given my business goals, what can I do to improve my profitability?
- Do I want to be the marketing CEO or the production CEO?
- How does this market fit into my personal preferences?
- How much processing do I want to do to sell into that market?
- What are the regulations and laws regarding selling into that market?

Sole proprietor.

Market Feasibility Issues	Strength/Weakness	Comments
Market size	Marketing is limited by labor constraints.	Often limited to local market demands and ability of proprietor to adequately manage all aspects of post-harvest handling and marketing.
Competition	Highly competitive	Very easy for local markets to be saturated and for other producers to impact local market demand in a highly competitive environment.
Revenue diversity	Typically limited by proprietor's expertise and time.	Generally lacks residual or backup markets to move unsold, poor quality or excess produce.
Ease of entry	Extreme ease of entry	Ease of entry dictates lack of operational structure. This often makes it difficult to monitor operations and manage for changes in competition.
Is there a need for the business?	Food is an essential and high priority for consumer dollars spending.	Consumer trends indicate a growth market in natural, organic and locally grown produce.

Partnership/Cooperative.

Market Feasibility Issues	Strength/Weakness	Comments
Market size	Consolidation can gain market access and market territory that can be served.	Helps address scalability needs of larger procurement buyers and generally opens up additional market opportunities.
Competition	Some competitors become allies, and cooperative operations provide better ability to remain sustainable among competitors.	May reduce outside competition or level the playing field and provides stability within the operation because of ability to compete on a larger scale.
Revenue diversity	Limited to producer's expertise but does bring more minds to the table and spreads time commitment among the group.	Allows for better use of skill sets from a larger group. More apt to have a mix of experienced growers/marketers/managers.
Ease of entry	Extreme ease of entry	Strengthens market position and may deter others from entry as well as bring stability and additional structure to operations.
Is there a need for the business?	Eliminates redundancy and increases market access.	Opens up more market opportunities that will move pricing more toward wholesale but reduces cost of post-harvest product handling and marketing.

Aggregator.

Market Feasibility Issues	Strength/Weakness	Comments
Market size	Provides scalability and dramatically increases territory that can be covered.	Greatly expands market size. Helps address scalability needs of larger procurement buyers.
Competition	Shifts marketing risk away from the producer but at a cost.	Competition may reduce value of crops.
Revenue diversity	Remains dependent on producer's individual expertise but strengthens by diversity created with multiple marketing alternatives.	Private aggregator will likely provide more product diversity out of necessity, thereby increasing market access for all parties.
Ease of entry	Extreme ease of entry	May encourage entry by others, which has potential to be good for the enterprise. Although producer entry is easy, success will depend on aggregator's knowledge and expertise.
Is there a need for the business?	Aggregation of product has been an issue for many procurement agencies.	Industry wants local produce but can't afford the transaction costs of dealing with numerous producers; this has strong potential for a win-win situation.

Market feasibility summary. It is important to remember that marketing produce is a well-established business that has been refined and honed to be highly efficient, with success based primarily on tight margins and large volumes. However, recent interest in local and regional foods has created a unique opportunity for aggressive, market-savvy individuals to carve out a market niche as the whole industry repositions to meet changing customer expectations. As a result of these changing expectations, there are unique opportunities for small producers who are committed to focusing on a local market and for larger producers willing to fill the regional food needs of mid-to-large market chains. Carefully understanding the market size, market expectation and the competition are critical elements in choosing the appropriate business structure and marketing strategy.

Technical feasibility

Typically, technical feasibility evaluates the equipment, the science and the operational skills needed to operate a business successfully. For the purpose of this comparison of hypothetical operations, emphasis will be placed on efficiency gained through consolidation. Major areas of consideration when analyzing technical feasibility include:

- Production
- Harvest handling
- Post-Harvest handling
  - Packaging
  - Labeling
  - Temperature control
  - Moisture loss

    - Storage
    - Transportation
    - Logistics
- Licensing and permitting requirements
- Food safety issues

All of these considerations relate directly to the individual's need or desire for autonomy from production to market. This is also directly related to the individual's willingness to take on risk. Typically, sole proprietors are willing to take on more risk to maintain their independence and product ownership through to the final customer. Cooperative or aggregator business models benefit from the need to share or spread risk and the desire to separate the management responsibilities of production from post-harvest handling and marketing.

Sole proprietor.

Technical Feasibility Issues	Strength/Weakness	Comments
Achievable production levels	Labor intensive, therefore time consuming to manage for high production levels as compared to traditional crops.	Production levels directly impact all aspects of the business and are labor intensive, taking time away from marketing and post-harvest activities.
Achievable income levels	Highly dependent on individual management time and skills.	Market driven, marketing is often a weak area of a sole proprietor operation.
Regulatory and permitting	Proprietor assumes all risk and can be spread thin among all responsibilities.	Operation often lacks structure, and individual lacks time to properly address all areas needing attention to detail.
Adequate supply of materials	Can be difficult to manage	Often an issue if multiple markets have different post-harvest handling needs (i.e., size, count, packaging etc.).
Available technical expertise	Often available expertise is unknown and difficult to engage.	Availability and ability to engage is proportionate to size of operation. Some private consulting may be required, but expense is difficult to justify.

Partnership/Cooperative.

Technical Feasibility Issues	Strength/Weakness	Comments
Achievable production levels	Production risk can be spread.	Without formal business structure, individual producers still carry substantial risk. The partnership/cooperative allows for delegating responsibilities and spreading time commitment among the group.
Achievable income levels	Highly dependent on market development and management.	Costs for post-harvest activities are shared and should result in higher per-unit returns.
Regulatory and permitting	Shared risk and responsibility with all participants.	Varied skill sets and interests will result in more efficient, effective overall management.
Adequate supply of materials	Reduces difficulty in management of supply side.	More effective in meeting varied market demands, dependent on inventory management strategies.
Available technical expertise	Improved access to technical assistance.	Increased access to expertise as a result of a larger network of participants.

Aggregator.

Technical Feasibility Issues	Strength/Weakness	Comments
Achievable production levels	More attention can be given to matching production with market demands; individual business activities are more effectively managed.	Producer attention will shift more toward maximizing production, knowing market and post-harvest activities are being addressed.
Achievable income levels	Producers will need to adjust to lower per-unit revenue, due to the middleman, but higher total sales.	Income is now more dependent on volume; increased demand is achieved through market access and market development.
Regulatory and permitting	Ability to manage quality and overall production issues should improve.	Time to devote to quality and regulatory issues will increase, which will likely improve management of overall production issues.
Adequate supply of materials	Improved availability	Will eliminate barriers to opening up new markets.
Available technical expertise	Improved accessibility	Increased access to expertise as a result of larger network and increased time to devote to fine-tuning all areas of the business model.

Technical feasibility summary. Being able to maintain a level of freshness from the field to the final customer presents challenges as does maximizing production efficiencies. Producers who have additional capacity to efficiently meet these challenges will be able to expand their marketing opportunities and are more likely to be competitive. This increase in capacity is evident in the Partnership/Cooperative and Aggregator models, with additional resources and more specialized attention to aspects of operations.

Equally important is the ability to identify and engage technical assistance to address particular areas of inefficiencies within the operations that affect financial success.

Management feasibility

Most entrepreneurs appreciate the importance of the technical and marketing aspects of business development, but to achieve success, they must also realize the importance of the heartbeat and personality of the business. If a business does not focus on management of operations, bringing the desired product to the customer at the required price is compromised. A key to success in any business is having clearly defined roles and responsibilities for all aspects of the business. Good managers realize their strengths and weaknesses and find experienced people to handle the tasks they do not totally understand or do not have the time, experience or interest in managing properly.

Sole proprietor.

Management Feasibility Issues	Strength/Weakness	Comments
Available expertise	Difficult to manage all diverse aspects of operations from production to marketing.	Sole proprietors rarely have adequate management skills to excel in all aspects of production, post-harvest activities and marketing.
Continuity and consistency	Continuity is inherently problematic and consistency can be challenging due to lack of resources.	Difficult to establish continuity when all responsibilities and expertise lie with one or two individuals; consistency suffers when attention either shifts entirely to the weakest area in times of distress or gets completely ignored.
Roles and responsibilities	Sole proprietor assumes all roles and responsibilities in the enterprise.	Being spread over all areas of operations creates lack of structure and neglect of proper management in certain areas.
Exit strategies	Ease of exit	Simplicity of structure allows maximum flexibility in designing and implementing an exit.

Partnership/Cooperative.

Management Feasibility Issues	Strength/Weakness	Comments
Available expertise	Increases pool of potential expertise and challenges in division of responsibilities.	Additional resources are available and will bring varied expertise; division of responsibilities can present challenges among participants.
Continuity and consistency	Continuity can be good. Consistency needs good structure.	Continuity is in a better position than in a sole proprietorship due to diversity in operations among several individuals; consistency will come with good operational structure.
Roles and responsibilities	Roles and responsibilities are divided among additional resources.	Additional resources provide opportunities for more time devoted to individual aspects of operations and a greater pool of talent for different roles.
Exit strategies	Exit strategies become more complicated but more diverse.	Additional operational structure creates more challenges in developing exit strategies, but additional resources allow better flexibility in options of exit strategies.

Aggregator.

Management Feasibility Issues	Strength/Weakness	Comments
Available expertise	Expertise becomes more specialized and specific.	Availability of expertise increases and is considerably stronger in the important area of market/marketing.
Continuity and consistency	Continuity is similar to sole proprietorship; consistency can be good.	Clear division between production and marketing leaves the sole-proprietor nature of production with challenges in creating and sustaining continuity; consistency can be effective in allowing more resources to devote to production with market handled separately.
Roles and responsibilities	Roles and responsibilities are clearly defined, allowing more time to focus on production.	Roles of production/harvest and post-harvest/market activities are now clearly defined, and additional time can now be devoted to production efficiencies.
Exit strategies	Exit strategies are designed from a simple structure.	Exit strategy opportunities and options are strong. Structured production and market divisions within total operations and diversification of markets can be established.

Management feasibility summary. Although the management structure among the three business models presented here may vary greatly, management determines the personality and direction of a company. Often, entrepreneurs are not great managers, but successful entrepreneurs ultimately are good managers either by their nature or by hiring strong management. Additional resources bring more overall expertise to the operations, continuity becomes better established and exit strategies, although potentially more complicated, bring more options to the table in the partnership/cooperative and aggregator models.

Consistency, roles and responsibilities need to have good structure within these two models. From a management standpoint, the aggregator model offers some potential advantageous scenarios, bringing clear divisions of production/harvest and post-harvest/market activities.

Financial feasibility

Financial feasibility will vary greatly for individual operators. For the purpose of this comparison, emphasis will be placed on efficiencies gained through consolidation. Assumptions will also be made to determine typical price distribution and profit sharing that will be incurred in the various business structure plans.

Each business structure will have different missions. When a business clearly defines its personality and its general direction, a vital business step has been taken. Reaching this pivotal point helps an organization determine if it is financially feasible. To assess the financial feasibility of a business, its objectives as well as the strategies to achieve those objectives need to be clearly stated. Additionally, there needs to be a system in place to measure the progress toward those objectives.

To financially evaluate these business structures, a definitive evaluation should be conducted in the form of a factual market assessment. A market assessment can be performed at two levels. The first level is a ‘desktop’ assessment; this may be Web research, phone calls or networking that provides some sense of trends, relationships and all relevant realities of the market(s) being evaluated. The second level involves the business getting its ‘feet on the street’ to secure real commitments or Letters of Intent.

Comparing the ‘costs of operation’ to ‘potential market and market penetration’ is the foundation to making a sound financial feasibility assessment.

The following table provides an example of how a risk/reward comparison can help compare alternative business models. In this example, a producer has three options to capture a portion of the margin on a product with a potential margin of $100. All models assume that the product is marketed through a distributor. As the risks and subsequent margins are reduced, the total amount of product that can be marketed increases, resulting in nearly identical net earnings.

Margin table.

Assumed Margin = $100	Producer % of Margin	% of Product Sold, Considering Loss, Market Access and Other Risks	Net Earnings
Sole proprietor	70%	40%	$28
Partnership/Cooperative	55%	55%	$30
Aggregator	40%	70%	$28

Obviously actual numbers can change with different types of produce and different business models, but this illustration illustrates the importance of carefully examining all aspects of business model options.

Sole proprietor.

Financial Feasibility Issues	Strength/Weakness	Comments
Development costs	All risk is assumed by the individual.	All infrastructure costs from production to final sale rest on the sole proprietor and will need to be recaptured through increased pricing or production.
Operating costs	All risk is assumed by the individual.	All operational costs from production to final sale rest on the sole proprietor and will need to be recaptured through increased pricing or production.
Reliable cash flow and financial projections	Individual must manage all aspects of the business to maximize profit.	The operation can be severely limited by the expertise and available time of the individual producer. Rarely does one individual have the necessary skill set and time to be highly proficient in production, processing, marketing and managing.
Operational risks	Fixed costs regardless of production levels, which stretches operational skill sets thin.	Operations are totally dependent on the sole proprietor. Margins are thin so input costs must be managed closely and often do not allow for the hiring of qualified individuals to spread expertise.

Partnership/Cooperative.

Financial Feasibility Issues	Strength/Weakness	Comments
Development costs	Post-harvest costs are shared.	Post-harvest costs are shared among multiple individuals or entities, creating economies of scale.
Operating costs	Post-harvest costs, labor and operating expenses are shared.	Operations following harvest become more efficient, with the ability to centralize certain operations among multiple entities.
Reliable cash flow and financial projections	Reliable cash flow becomes more likely with shared risk and cost structure.	Sharing of post-harvest costs of operations leads to more efficient, effective operations, resulting in less individual risk.
Operational risks	Shared risk for all post-harvest and handling operations.	The strength of this scenario is highly dependent on the working relationship and delegation of responsibilities within the organization; this structure can make or break the operation, but the opportunity exists for more efficient operations.

Aggregator.

Financial Feasibility Issues	Strength/Weakness	Comments
Development costs	All production risk is assumed by the proprietor, but all post-harvest development costs are the responsibility of the aggregator.	Development costs, hence risk, is spread between the producer and aggregator; efficiencies and effectiveness of management can increase substantially.
Operating costs	Production and post-harvest costs are shared by the proprietor and aggregator.	The proprietor is able to focus on production, while the aggregator focuses on post-harvest logistics, processing and marketing.
Reliable cash flow and financial projections	Predictable but does require a set margin and higher volume of product flow-through.	All aspects of operations can become more predictable and reliable with management of specific areas receiving more focused attention.
Operational risks	Highly dependent on supply/demand relationship, inventory management and effectiveness of the individual aggregator.	The strength of this scenario is highly dependent on the business relationships developed up and down stream; this structure can make or break the operation.

Financial feasibility summary.

Item	$/Tunnel	Expected Life (years)
Preplant costs	$120	10
Tunnel construction costs (tunnel, automated sides, ends, labor)	$8,000	10
Irrigation supplies/equipment	$230	10
Stakes and twine	$250	10
Total	**$8,600**	

The striking difference between the sole proprietor operation and either the partnership/cooperative or aggregator operations in terms of financial feasibility is the introduction of economies of scale and resulting effect on the business model. When operating in a multiple entity environment, development and operational costs can be reduced and risks spread. Cash flow projections become more predictable, hence more reliable, and operational risks are spread by increasing the number of players involved and by introducing more expertise and focus into overall operations.

As stated in the introduction to this feasibility section, comparing the costs of operation to the potential market and market penetration is the foundation to making a sound assessment of financial feasibility. As can be seen by the margin table and the detail within the comparison of the three models, the introduction of additional entities into operations will decrease the producer share of profits but has a potential to result in equal or more net profits, especially as market potential and production are increased. This potential, along with spreading risk and focusing management on specific operations, presents opportunities that merit consideration.

Summary of initial capital investment for tunnel[1].

Item	$/Tunnel	Expected Life (years)
Preplant costs	$120	10
Tunnel construction costs (tunnel, automated sides, ends, labor)	$8,000	10
Irrigation supplies/equipment	$230	10
Stakes and twine	$250	10
Total	**$8,600**	

Tomato production in a 30 foot x 96 foot high tunnel.

Item	Quantity (hours)	$/Tunnel
Labor ($10/hour)		
Cover tunnel	6	$60
Retighten cover	4	$40
Soil preparation and planting	12	$120
Scouting and pesticide application	8	$80
Maintenance (stake, weed, prune, etc.)	35	$350
Monitor and ventilation	8	$80
Harvest, grading and packaging	50	$500
Post-season cleanup	6	$60
Supplies/Materials		
Fertilizer		$35
Plastic mulch		$18
Transplants (including seed)	360	$75
Fuel and electrical		$25
Pesticides		$25
Lab testing		$30
Harvest supplies		$500
Scouting supplies		$50
Water ($4.90/1,000 gal.)	15,000 gal.	$74
1/10 of initial costs		$860
	Total	**$2,982**

Summary of production[3].

Yield/Tunnel	Gross Income/Tunnel
5,200 pounds marketable ($2/pound)	$10,336
Total production expenses	$2,982
Net income	**$7,354**

Summary of initial capital investment for tunnel[1]: Pepper.

Item	$/Tunnel	Expected Life (years)
Preplant costs	$120	10
Tunnel construction costs (tunnel, automated sides, ends, labor)	$8,000	10
Irrigation	$230	10
Stakes and twine	$100	10
Total	**$8,500**	

Production in a 30 foot x 96 foot high tunnel.

Item	Quantity (hours)	$/Tunnel
Labor ($10/hour)		
Cover tunnel	6	$60
Retighten cover	4	$40
Soil preparation and planting	12	$120
Scouting and pesticide application	8	$80
Maintenance (stake, weed, prune, etc.)	8	$80
Monitor and ventilation	8	$80
Harvest, grading and packaging	45	$500
Post-season cleanup	6	$60
Supplies/Materials		
Fertilizer		$25
Plastic mulch		$80
Transplants (including seed)	350	$225
Fuel and electrical		$25
Pesticides		$25
Lab testing		$30
Harvest supplies		$150
Scouting supplies		$50
Water ($4.90/1,000 gal.)	19,000 gal.	$95
1/10 of initial costs		$850
Total		**2,575**

Summary of production[3].

Yield/Tunnel	Gross Income/Tunnel
60 boxes (28 pounds/box; $28/box)	$1,680
Total production expenses	$2,575
Net income	**$-895**

Blackberry ('Prime Jan') and Raspberry ('Autumn Bliss') Production in a 30 Foot x 96 Foot High Tunnel.

Summary of initial capital investment for tunnel[1].

Item	$/Tunnel	Expected Life (years)
Preplant costs	$120	10
Tunnel construction costs	$8,000	10
Plants	$357	10
Planting	$375	10
Irrigation	$230	10
Trellis	$557	10
Total	**$9,264**	

Summary of production costs per year[1].

Item	Quantity (hours)	$/Tunnel
Labor ($10/hour)		
Cover tunnel	6	$60
Retighten cover	4	$40
Scouting and pesticide application	4	$40
Prune and train canes	8	$80
Narrow rows	6	$60
Maintenance	9	$90
Monitor and ventilation	8	$80
Harvest and packaging	51	$510
Supplies/Materials		
Fertilizer		$5
Pesticides		$25
Lab testing		$30
Harvest supplies		$1,000
Scouting supplies		$50
Water ($4.90/1,000 gallons)	15,000	$75
1/10th of initial investment		$926
Total[2]		**$3,071**

Summary of production[3]

Yield/Tunnel	Gross Income/Tunnel
1,440 pounds at $6/pound	$8,640
Total production expenses	$3,071
Net income	**$5,569**

[1]Adapted from Heidenreich, Cathy, Marvin Pritts, Mary Jo Kelly and Kathy Demchak. High Tunnel Raspberries and Blackberries. Cornell University, Ithaca, NY. 2008 rev.; Estimate does not include equipment costs (tiller, mulch-layer, hoes, rakes, trowels, etc.) and interest.
[2]Does not include land rental.
[3]Taber, Henry G., Bernard Havlovic and Nick Howell. 2007. High Tunnel Pepper Production. 2007 ISU Outlying Research Farms Report.